The Many Users and Uses of Weather Data

WFO Albuquerque

Weather Data Awareness Week 2005

Weather data comes in a variety of forms from a number of sources. The data can be obtained from human reports, in situ instruments, or remote sensors. Clearly, meteorologists at the National Weather Service, as well as those at the various private companies, comprise a significant portion of the users of weather data. However, for nearly every facet of our population, weather data has a critical role in decision making.

Forecasters use meteorological data to support a number of programs including public, aviation, fire and marine. Forecasters preparing public products routinely monitor temperature data to produce 1 to 7 day forecasts of temperature. These same values are also used for verification of their forecasts. Aviation forecasters keep a keen eye on surface observations for wind shear, weather or restrictions to visibility that could adversely affect take-offs and landings. Additionally, conditions aloft must be monitored to watch for areas of icing or turbulence. Forecasters support fire weather programs by watching not only the more common elements of temperature and wind, but also relative humidity because it can have a critical impact on the behavior of fires.

For forecasters involved in short term warning operations, meteorological data is exceptionally important. Data associated with events that can result in loss of life and destruction of property such as severe storms, hurricanes, and extreme winter storms, must be carefully monitored in order to issue warnings, which are timely and accurate.

Similarly, to researchers within the field of meteorology, weather data is an integral component of their work. Long records of data are used to compile climatologies. Changes noted within the climatological records are used to examine climate variability and research the notion of climate change. For modelers, those who work on numerical weather prediction, the data are important for model initialization and also for verification.

However, nearly every member of the population uses weather data on a regular basis. By thinking of how weather can affect your travel, activity, and business decisions, the list of uses and users becomes longer. And while making a complete list of users and uses would take more space than is available here, a diverse range is described here.

Public utility companies need to monitor extremes in weather to ensure they are prepared to deliver sufficient electricity or gas to the population.

All areas of the military carefully watch weather observations as weather can severely impact military operations as well as their supporting personnel and equipment.

Those monitoring and predicting air quality use a variety of weather sources, including upper air soundings, to watch for conditions resulting in periods of poor air quality.

Emergency managers monitor weather conditions to “gear up” for significant weather events.

Many aspects of the weather are critical to the agriculture community. Farmers must monitor observations before deciding to plant, irrigate, make hay, or apply insecticides or fertilizers.

The transportation industry makes a number of their decisions based on weather. Road and rail conditions must be monitored for safe travel. Maintenance workers monitor the data to keep the roads and rail lines clear. Some high profile vehicles are dangerous to operate under conditions of strong wind. Some cargo is highly susceptible to extreme temperatures. Cargo ships could experience delays or accidents due to areas of large waves. Travelers do not want to be delayed or stranded. Air traffic managers must closely monitor changing conditions to maintain safe conditions and keep delays to a minimum. This is especially true at larger airports where small changes in weather can produce substantial impacts.

Many retail operations have seen great success or dismal returns based on their stock. Retailers have periods during which they will have an onslaught of business such as plywood prior to hurricane landfall or groceries the day before a winter storm.

Commodity traders make a number of decisions based on weather data. A freeze in Florida could likely affect the price of citrus or crops.

Constructions workers carefully observe data, looking for periods to pour concrete or operate a crane.

Fire fighters watch for changes in the weather that could affect the growth and spread of a fire, or the behavior of a hazardous materials spill.

Many specialties in the field of engineering regularly rely on weather data, and climatologies derived from the data. Hydrological engineers monitor stream flow, snow depth and precipitation data. Civil engineers and architects rely on temperature, precipitation and wind extremes when designing and building highways, bridges and buildings. Engineers designing solar or wind energy sources rely on weather data for site selections.

Weather data supports a wide range of scientific fields. Entomologists can anticipate sudden increases or decreases of certain insects based on weather data. Animal scientists know that certain weather regimes can have adverse effects on animal populations. Astronomers and radio specialists plan many of their activities based on the condition of the atmosphere. Those in the health and medical field educate patients with respiratory illnesses to check weather as various medical conditions can be influenced by changes in any one of several weather elements.

Marine weather data supports a wide range of customers from the interests of recreational sailors and boaters to the interests of commercial fishing companies and cruise lines.

Are you preparing for a recreational or sporting activity? Responsible hunters, golfers, hikers, skiers know to check weather conditions before starting out. For professional athletes, those maintaining their playing fields check weather data prior to mowing or covering the field. And field or track conditions determine the type of shoe an athlete wears or the tire mounted on a racecar.

Forensic specialists often request official records of weather data. Weather observations may be used to determine the cause of an accident, the damage to a residence or the conditions of a crime scene.

Even though we haven't covered all the uses of weather data, it's obvious that weather data influences a wide range of decisions we make for everything from business to pleasure. The impact on the nation is virtually incalculable, whether one is considering monetary benefits or the emotional well being of our people. The trend proves that weather data will not only remain an important factor in the decisions we make, but will continue to increase importance in the years ahead.